

## THE CLAIMS

What is claimed is:

1. A bone plate assembly for spinal surgery comprising:
  - a bone plate having a longitudinal axis, a distal end, and a proximal end, a plurality of pairs of fixation holes each having a central axis, each pair of fixation holes symmetrically arranged about the longitudinal axis for receiving a bone anchor therethrough, the fixation holes having conical seating surfaces being angled inward toward the longitudinal axis of the bone plate, and wherein the central axes of the fixation holes adjacent the distal end are angled toward the distal end, the central axes of the pair of fixation holes adjacent the proximal end are angled toward the proximal end, and the conical seating surfaces have screw threads for mating with corresponding screw threads on the bone anchor to fix the bone anchor at a predetermined angle along the longitudinal axis.
2. The bone plate assembly of claim 1 further comprising at least one slotted hole along the central longitudinal axis of the plate.
- 15 3. The bone plate assembly of claim 2 wherein the slotted hole has at least partial threads at an end.
4. The bone plate assembly of claim 3 wherein the slotted hole has at least partial threads at both ends separated by unthreaded sections.
5. The bone plate assembly of claim 1, further comprising a step feature to facilitate 20 the placing of the bone plate on the sacral promontory.
6. A surgical drill guide assembly comprising:
  - a stem having a longitudinal axis;
  - at least one drill guiding barrel attached to the outer stem and configured to receive and guide a surgical drill bit;
  - 25 a tab to engage an opening in a bone plate to align and stabilize the drill guide assembly;
  - a rod releasably attached to both the outer stem and the bone plate; and
  - a release mechanism for attaching the stem and rod.
7. The surgical drill guide assembly of claim 6, further comprising a handle member 30 offset from the stem by an offset handle arm.

8. The surgical drill guide assembly of claim 7, wherein the handle member pivots in relation to the offset handle arm.
9. The surgical drill guide assembly of claim 6, wherein the release mechanism has a non-circular passage.
- 5 10. The surgical drill guide assembly of claim 6, wherein the rod has a non-circular cross section at one end.
11. The surgical drill guide assembly of claim 6, wherein the rod is threaded at one end.
12. The surgical drill guide assembly of claim 6, further comprising one or more ball detents located in the stem and a groove located on the rod, wherein the one or more ball 10 detents and groove are used to releasably attach the stem to the rod.
13. The surgical drill guide assembly of claim 6, wherein the drill guide barrel pivots about a hinge on the stem.
14. The surgical drill guide assembly of claims 6, wherein there are two drill guide barrels.
15. The surgical drill guide assembly of claim 6, wherein the drill guide barrel has a plurality of drill insertion locations.
16. The surgical drill guide assembly of claim 6, wherein the drill guide barrel has multiple insertion passageways at different angular orientations.
17. The surgical drill guide assembly of claim 16, wherein the insertion passageways 20 have angular orientations of about 0° to about 10° toward the longitudinal axis of a bone plate and about 75° to about 90° upward or downward to the longitudinal axis of a bone plate.
18. The surgical drill guide assembly of claim 6, wherein the drill guide barrel has a depth stop for preventing a drill bit from exceeding a pre-determined depth.
- 25 19. The surgical drill guide assembly of claim 6, wherein the tab is attached to the drill guide barrel.

20. The surgical drill guide assembly of claim 8, further comprising a button cam, wherein the handle member and offset handle arm are releasably locked in angular position by detents on a button cam being moved into or out of engagement with detent grooves in the handle member.

5 21. A method of installing a bone plate on vertebrae, comprising the steps of:

inserting a plate holder into a locking bone plate;

releasably locking a drill guide assembly onto the plate holder;

placing the bone plate on vertebrae;

aligning a drill bit with an insertion location in a drill guiding barrel of the drill

10 guide assembly;

drilling a hole in bone through a fastener hole in the locking bone plate;

inserting a bone screw into the fastener hole; and

releasing the plate holder rod and drill guide assembly from the bone locking plate by rotating a release sleeve on the drill guiding assembly.

15 22. The method of installing a bone plate on vertebrae according to claim 21, wherein the bone plate is placed on the vertebrae before the drill guide assembly is locked to the plate holder

23. The method of claim 21, further comprising the step of inserting the plate holder rod into a second slotted hole in a locking bone plate by rotating the release sleeve.

20 24. The method of claim 21, wherein the bone screw is inserted into the drill guiding barrel and threaded into the fastener hole.